

## CLAIMS

What is claimed is:

1. An on board vehicle data transmission system comprising:  
a set of peripheral modules operatively associated with respective sensors for generating respective sensing signals, in a transmission time slot determined by a synchronization signal, when said sensors detect a predetermined condition; and  
a main unit that outputs the synchronization signal, receives said sensing signals from said set of peripheral modules in the respective transmission time slots and is capable of entering into a state of reduced power absorption in the absence of useful transmissions from said peripheral modules.
2. The system of claim 1 wherein said main unit inhibits its own signal receiving function in correspondence to an absence of a sensing signal in the determined time slot assigned for transmission.
3.  
4. The system of claim 1 wherein said peripheral modules include a respective module for pre-processing the sensing signal received from the corresponding associated sensor.

4/8. The system of claim 1 wherein said peripheral modules include associated power-supply sources, each of which includes a circuit for monitoring the state of said power-supply source.

5/8. The system of claim 1 wherein said peripheral modules transmit to said main unit a further signal indicating the state of the respective power-supply source.

6/8. The system of claim 1 wherein said main unit is configured for transmits a verification signal, indicating the outcome of a previous communication to the main unit, to said peripheral modules.

7/8. The system of claim <sup>6</sup>7 comprising at least one peripheral module which can be associated to a respective sensor for generating a sensing signal represented by a counting value, and in that said at least one peripheral module is capable of detecting, starting from the verification signal received from said main unit, failure of transmission of a previous counting value and of carrying out the subsequent transmission of a counting-detection signal as a cumulative value of the value transmitted in the previous transmission and not received, and of the amount of the counting accumulated starting from said previous transmission.

<sup>8</sup>/~~8~~. The system of claim 1 wherein said main unit is identified by a respective network address, and selectively communicates variations in said network address to said peripheral modules.

<sup>9</sup>/~~10~~. The system of claim <sup>8</sup>/~~9~~ wherein said main unit is configured for detecting a persistence of transmission events having negative outcome coming from one of said peripheral modules and for consequently varying the respective network address.

<sup>10</sup>/~~11~~. The system of claim 1 wherein said main unit and said peripheral modules comprise respective transceiver modules for wireless transmission of said signals.

<sup>11</sup>/~~12~~. The system of claim <sup>10</sup>/~~11~~ wherein said transceiver modules are configured for radio-frequency transmission.

<sup>12</sup>/~~13~~. The system of claim <sup>10</sup>/~~11~~ wherein said transceiver modules operate with FSK-type modulation.

<sup>13</sup>/~~14~~. The system of claim 1 wherein said main unit receives said sensing signals and transmits selected signals to a processing unit of a higher hierarchical level.

<sup>14</sup>  
~~13~~. The system of claim <sup>13</sup>~~14~~ wherein the time slots used for data transmission from said main unit to said processing unit of higher hierarchical level are divorced in time from the time slots used for transmission from said peripheral modules to said main unit.

<sup>15</sup>  
~~16~~. The system of claim <sup>13</sup>~~14~~ wherein transmission from said main unit to said processing unit of a higher hierarchical level takes place in selected pre-determined time slots.

<sup>16</sup>  
~~17~~. The system of claim <sup>15</sup>~~16~~ wherein the time slots used for data transmission from said main unit to said processing unit of higher hierarchical level are divorced in time from the time slots used for transmission from said peripheral modules to said main unit.

<sup>17</sup>  
~~18~~. The system of claim <sup>13</sup>~~14~~ wherein said main unit is configured for transmission to said processing unit of a higher hierarchical level on a physical channel.

<sup>18</sup>  
~~19~~. The system of claim 1 wherein said synchronization signal is a periodic signal and said time slots are identified according to a respective delay signal starting from said synchronization signal.

<sup>19</sup>  
~~20.~~

A system for data transmission on board a vehicle comprising:

a set of peripheral modules associated with respective sensors for generating respective sensing signals when said sensors detect a predetermined condition; and

a main unit that outputs a synchronization signal and receives said sensing signals coming from said set of peripheral modules;

wherein said peripheral modules selectively transmit said sensing signals to the main within a framework of respective transmission time slots determined by said synchronization signal;

wherein said synchronization signal is a periodic signal and said time slots are identified according to a respective delay signal starting from said synchronization signal; and

wherein said main unit is capable of entering into a state of reduced power absorption in the absence of useful transmissions from said peripheral modules and still transmitting said synchronization signal while in said state of reduced power absorption.

<sup>20</sup>  
~~21.~~

The system of claim <sup>19</sup>~~20~~ wherein said peripheral modules include a respective module for pre-processing the sensing signal received from the corresponding associated sensor.

<sup>21</sup>  
~~22.~~ The system of claim <sup>19</sup>~~20~~ wherein said peripheral modules include associated power-supply sources, each of which includes a circuit for monitoring the state of said power-supply source.

<sup>22</sup>  
~~23.~~ The system of claim <sup>21</sup>~~22~~ wherein said peripheral modules transmit to said main unit a further signal indicating the state of the respective power-supply source.

<sup>23</sup>  
~~24.~~ The system of claim <sup>19</sup>~~20~~ wherein said main unit is configured for transmits a verification signal, indicating the outcome of a previous communication to the main unit, to said peripheral modules.

<sup>24</sup>  
~~25.~~ The system of claim <sup>23</sup>~~24~~ comprising at least one peripheral module which can be associated to a respective sensor for generating a sensing signal represented by a counting value, and in that said at least one peripheral module is capable of detecting, starting from the verification signal received from said main unit, failure of transmission of a previous counting value and of carrying out the subsequent transmission of a counting-detection signal as a cumulative value of the value transmitted in the previous transmission and not received, and of the amount of the counting accumulated starting from said previous transmission.

<sup>25</sup>  
~~26.~~ The system of claim <sup>19</sup>~~20~~ wherein said main unit is identified by a respective network address, and selectively communicates variations in said network address to said peripheral modules.

<sup>26</sup>  
~~27.~~ The system of claim <sup>25</sup>~~26~~ wherein said main unit is configured for detecting a persistence of transmission events having negative outcome coming from one of said peripheral modules and for consequently varying the respective network address.

<sup>27</sup>  
~~28.~~ The system of claim <sup>19</sup>~~20~~ wherein said main unit and said peripheral modules comprise respective transceiver modules for wireless transmission of said signals.

<sup>28</sup>  
~~29.~~ The system of claim <sup>27</sup>~~28~~ wherein said transceiver modules are configured for radio-frequency transmission.

<sup>29</sup>  
~~30.~~ The system of claim <sup>27</sup>~~28~~ wherein said transceiver modules operate with FSK-type modulation.

<sup>30</sup>  
~~31.~~ The system of claim <sup>19</sup>~~20~~ wherein said main unit receives said sensing signals and transmits selected signals to a processing unit of a higher hierarchical level.

<sup>31</sup>  
~~32.~~ The system of claim <sup>30</sup>~~31~~ wherein the time slots used for data transmission from said main unit to said processing unit of higher hierarchical level are divorced in time from the time slots used for transmission from said peripheral modules to said main unit.

<sup>32</sup>  
~~33.~~ The system of claim <sup>30</sup>~~31~~ wherein transmission from said main unit to said processing unit of a higher hierarchical level takes place in selected pre-determined time slots.

<sup>33</sup>  
~~34.~~ The system of claim <sup>32</sup>~~33~~ wherein the time slots used for data transmission from said main unit to said processing unit of higher hierarchical level are divorced in time from the time slots used for transmission from said peripheral modules to said main unit.

<sup>34</sup>  
~~35.~~ The system of claim <sup>30</sup>~~31~~ wherein said main unit is configured for transmission to said processing unit of a higher hierarchical level on a physical channel.



<sup>35</sup>  
~~36.~~ The system of claim <sup>19</sup>~~20~~ wherein said synchronization signal is a periodic signal and said time slots are identified according to a respective delay signal starting from said synchronization signal.

<sup>36</sup>  
~~37.~~ A system for data transmission on board a vehicle comprising:

- a set of peripheral modules which can be associated to respective sensors for generating respective sensing signals; and
- a main unit designed to receive said sensing signals coming from said set of peripheral modules;

wherein said peripheral modules are configured to transmit said sensing signals in a selective way, in the framework of respective transmission time slots determined by said main unit;

wherein said main unit and said peripheral modules comprise respective transceiver modules for wireless transmission of said signals;

wherein said transceiver modules are configured for radio-frequency transmission; and

wherein said transceiver modules preferably use frequencies from 902 to 928 MHz and from 2400 to 2483.5 MHz, and frequency bands from 433 MHz to 434.8 MHz, from 868 to 870 MHz, and from 2400 to 2483.5 MHz.

<sup>37</sup>  
~~38.~~ An on board system for cycle data transmission comprising:

a set of peripheral modules associated with a vehicle for generating respective signals corresponding to detection of predetermined conditions; and

a main unit that receives said signals from said set of peripheral modules;

wherein said peripheral modules selectively transmits the signals to the main unit upon the occurrence of a predetermined condition.

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39. An on board system for cycle data transmission, comprising:

a set of peripheral modules associated with a vehicle for generating respective signals corresponding to detection of predetermined conditions; and

a main unit that receives said signals from said set of peripheral modules;

wherein said peripheral modules selectively transmits the signals to the main unit upon the occurrence of a predetermined condition.

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40. The system of claim 39 wherein the peripheral modules include a preprocessing capability that is responsive to the occurrence of a predetermined condition and transmit in time slots determined by a synchronization signal generated by the main unit.

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41. An on board vehicle data transmission system comprising:

a set of peripheral modules operatively associated with respective sensors for generating respective sensing signals when said sensors detect a predetermined condition; and

a main unit that receives said sensing signals from said set of peripheral modules and is capable of entering into a state of reduced power absorption in the absence of the predetermined condition.